# **Co-Benefits: Evaluating The Multiple Benefits of Clean Energy Actions**

### **Denise Mulholland**

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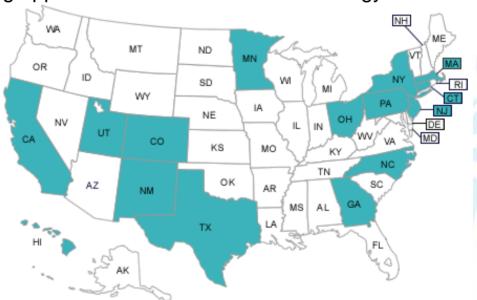
## The Clean Energy-Environment State Partnership

#### **EPA** provides:

- Dedicated, hands-on assistance evaluating strategic and programmatic options
- Targeted guidance and analysis
- State-to-state peer exchange and communication support
- Information about funding opportunities and related clean energy resources
- National recognition

#### Partners take action:

- Collaboration among state agencies
- Establish clean energy goals
- Evaluate options and measure benefits
- Develop clean energy action plan







Participating States (15):

CA, CO, CT, GA, HI, MA, MN, NC, NJ, NM, NY, OH, PA, TX, UT

## Many States Interested in Co-Benefits of Clean Energy

- States have different:
  - > Goals:
    - Economic, Energy, Environment
  - Champions & Clients:
    - Governor, Legislature, Agency Staff, Local Governments, NGOs, General Public
- Each may require different information to motivate or validate action(s)
  - Jobs, greenhouse gas emissions, air pollution, renewable energy
  - Prospective versus Retrospective Analyses





## Resources for States – Example Tools, Analysis, Expertise



#### **Guidance:**

- Clean Energy-Environment Guide to Action: Policies, Best Practices and Action Steps for States
- SEP Toolkit
- SIP Guidance for EE/RE Actions
- Clean Energy potential assessment guidance
- Lead By Example Guidebook
- Guidebook for Assessing Multiple Benefits

#### **Quantifying State Emissions:**

- State GHG Inventory Tool
- NACAA Clean Air and Climate Protection Software
- E-Grid
- E-Calc







#### **Evaluating Clean Energy Policy Options:**

- Cost Benefits & Emissions (GHG, Air Pollution):
  - CACPS Policy Assessment Module
- Macroeconomic Impacts:
  - Access to Economic Models
- Human Health Effects:
  - Co-Benefits Risk Assessment (COBRA)
  - Mitigation Impact Screening Tool (MIST)

#### **Communicating Benefits**

GHG Equivalency Calculator

#### **State-to-State Peer Exchange**

- EE/RE State Technical Forums
- Conferences and training sessions
- Reports and white-papers

## Coordination with Other Voluntary Programs:

- Green Power Partnership
- CHP Partnership
- National Action Plan for Energy Efficiency

## Selecting the Right Tool for the Job – Key Questions for Getting Started with Measurement

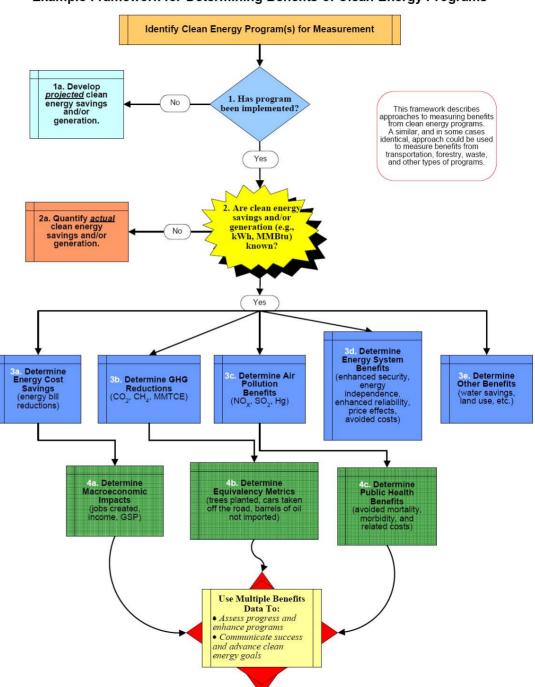
- Who is the audience and what kinds of information do they need?
- Why is analysis being undertaken?
  - Do you need to demonstrate the value of an existing program or persuade investment in a new one?
- What resources are necessary? available?
  - Data
  - Expertise, level of rigor
  - Financial
  - > Time
  - Staff

Answering
these
questions
helps
determine what
tools & models
are
appropriate to
the
policy or
program
context.





This Co-benefits framework helps to map out process, questions and options

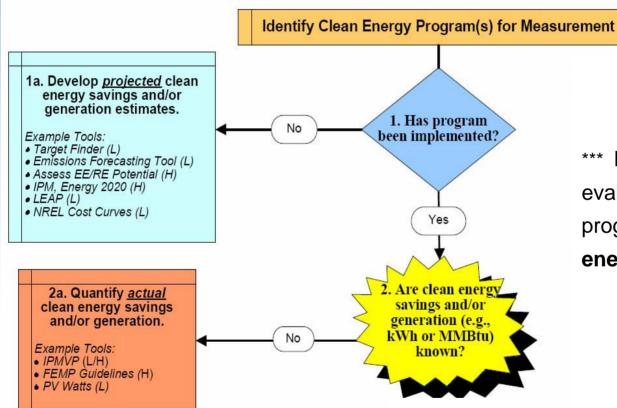






## **Getting Started**

### Example Framework for Determining Benefits of Clean Energy Programs



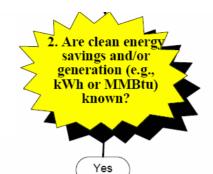
\*\*\* Key data need for evaluating clean energy programs is actual energy savings;

> Once savings are known, it is much easier to identify the multiple benefits of clean energy.





## **Estimating Primary Co-Benefits**



3a. Determine **Energy Cost** Savings (energy bill reductions)

Example Tools: Portfolio Manager (L) • Clean Air Climate Protection Software (L) Spreadsheet Calculation Using

EIA Data (L)

• IPM (H)

3b. Determine GHG Reductions (CO2, CH4, MMTCE)

Example Tools: EGRID Emissions Factors (L) Clean Air Climate

- Protection Software (L) Plant-based Displaced Emissions Analysis (H)
- IPM (H)
- CHP Emissions Calculator (L)
- OTC Workbook (L)

Methods can be simple:

 using regional emissions factor

- ...Or complex:
- matching capacity to loads
- capacity expansion modelina

**Determine Air Pollution Benefits**  $(NO_y, SO_2, Hg)$ 

Example Tools: EGRID Emissions Factors (L)

- Clean Air Climate Protection Software
- Plant-based Displaced Emissions
- Analysis (H) IPM (H)
- CHP Émissions Calculator (L)
- OTC Workbook (L)

3d. Determine **Energy System** Benefits (enhanced independence. enhanced

security, energy reliability, price effects, avoided costs)

Example Tools: MARKAL (H)

- NEMS (H) Avoided Électric Supply Costs (L)
- Spréadsheet Calculation Using EIA Data (L)

Once energy savings and/or generation is known, it is possible to estimate:

- **Energy cost savings**
- Greenhouse gas emission reductions
- Air Pollution Benefits
- **Energy System Benefits**
- Other...





3e. Determine Other Benefits (water savings. land use.

etc.)

## **Taking Co-Benefits Estimates Further**

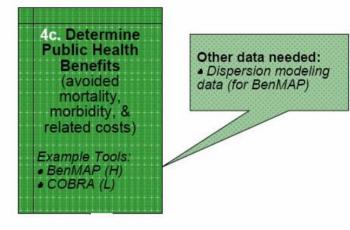
4a. Determine
Macroeconomic
Impacts
(jobs created, income, GSP)

Example Tools:
• Community Energy
Opportunity Finder (L)
• JEDI (L)
• REMI (H)
• IMPLAN (H)
• AMIGA (H)

4b. Determine Equivalency
Metrics
(trees planted, cars taken off the road, barrels of oil not imported)

Example Tools:

• GHG Equivalency Calculator (L)



#### Other data needed:

- Investment by firms
- Program costs
- Energy price forecasts

Then, building on previous analyses,

- Energy costs savings can be used to estimate macroeconomic impacts (e.g. jobs)
- Greenhouse gases can be translated into easily understood metrics (e.g. cars, trees), and
- Air pollution benefits can be used to approximate human health effects (and related economic benefits).





## **Using Co-Benefits**

### Use Multiple Benefits Data To:

- Assess progress and enhance programs
- Communicate success and advance clean energy goals

- Multiple benefits data can be used to inform key stakeholders and/or decision-makers about progress and new opportunities.
- Co-benefits can expand the number of parties interested in issue
- It can also demonstrate progress or shortfalls relative to multiple goals.
- BUT this cannot be done easily without the energy savings or generation data.





## **Opportunities for ECAI Collaboration**

- As stated, determination or estimation of energy savings and/or generation data is key to estimating benefits of clean energy for states
  - EPA has many tools to assess ancillary benefits but could use additional tools and guidance for state-level energyrelated analyses
- Potential opportunities for collaboration
  - Technical peer review of products & tools
  - Provision of information and/or guidance for states conducting energy analyses
  - Others?





## **For More Information**

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